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1. Discuss the various radiation measuring devices used in a Radiotherapy Department and their application in beam monitoring, dosimetry and Quality assurance.
2. Discuss the physical principles, design details and operational features of a modern therapy simulator. Discuss the relative roles of this equipment versus or in conjunction with the use of CT in treatment planning.
3.
 - (a) Briefly outline the principles of the procedure for the absolute calibration of megavoltage photon and electron beams (i.e. the determination of the dose per monitor unit under reference conditions) in a radiotherapy department.
 - (b) Comment on the choice of phantom material and type of radiation detector used for these calibrations.
 - (c) What factors need to be taken into account in the calculation of the number of monitor units required to deliver a particular dose from a given megavoltage beam to a particular point on the axis of that beam within a patient?
 - (d) How does the linear accelerator control the number of monitor units which it delivers in an irradiation?
4.
 - (a) Discuss briefly the basic principles of brachytherapy and its advantages and disadvantages relative to external beam therapy.
 - (b) Describe the sources, the method of positioning them within the tissues, and the equipment typically employed in performing prostate brachytherapy at:
 - i. high dose rate and
 - ii. low dose rate.
 - (c) Comment on the choice of radionuclide for these sources.
5. Discuss methods and techniques used in avoidance and detection of dose delivery errors in external beam radiation therapy.
6. Discuss the physical advantages and disadvantages of the following treatment methods in the treatment of an unresectable parotid carcinoma invading the zygoma
 - (a) static wedged pair photon beams (6MV)
 - (b) electron beam
 - (c) intensity modulated radiation therapy using 6MV photons.